APPENDIX D

PHASE II FIELD NOTES

PBR PILOT STUDY

PHASE 2

BOOK 1

AUGUST 2001

NATIONAL

416

FIELD / TRANSIT BOOK

Property of Foster Wheeler Environmental

Address 9640 E. Deere Ave. #200
Santa Ana, CA 92705

Telephone (949) 756-7500

INDEX

8-16-01

855

D. Tietje onsite.

900

Per Mark Lost, will collect 3 samples for fish bioassay analysis, 1 from each waste stream — NaAc, $(NH_4)_2PO_4$ sol'n, reactor water.

Established sample IDs

WPBR1-L-2 = reactor ww

WPBR1-L-3 = NaAc solution

WPBR1-L-4 = $(NH_4)_2PO_4$ solution

9:30 Collected sample WPBR1-L-2

9:40 Collected sample WPBR1-L-3

9:45 Collected sample WPBR1-L-4

9:50 Complete COC Form.

10:00 Depart site

Paul Tietje

9/10/01

D. Tietje onsite 0900

Measure available area for installing new tanks - between electrical shed + trailer on west side of fenced-in area.

Confirmed inventory of waste containers on-site. Relabeled w/ perm. marker on drum lids - need to bring non-iron labels to site.

Met w/ Foster McLean to accept signed profile forms and letter certifying waste containing bacteria is non-pathogenic.

1045 Tietje offsite.

David Tietje

10/2/01

735 Tietje, Losi onsite.

Begin cleaning up lenses, trash from work area + taking inventory of the materials.

1000 Hazpak Inc. onsite to remove waste drums from Phase I work

1120 Hazpak offsite.

Hazpak forgot to have FW A sign work order - told them this was OK - to just mail me copy.

1135 Depart site.

1230 Return to site. Continue working on site cleanup/inventory.

1620 Losi offsite.

1630 Tietje offsite

<David Tietje>

10/5/01

8 00	Tietje onsite. Losl already onsite.
845	Lv site to pick up PVC pipe + fittings + work materials.
1035	Return to site.
1040	Ryan Herco onsite to offload PE tanks. On standby - waiting for JPL forklift.
1125	Ryan Herco offsite.
1130	Depart site to PL lunch.
1210	Return from lunch. Begin plumbing of system - begin w/ piping from substrate supplement tanks to original substrate tanks, EQ Tank 2 to Bag filter.
1400	Losl offsite.
1630	Tietje offsite.

David Tietje

10/8/01

730	Tietje onsite.
	Hook up tubing to outlet of T-1 and route to Baker Tank.
< 930	M. Goh, Losl on-site.
	Preparation for delivery of PC-295, TW-18; Pump out T-1
945	Barnebey Sutcliffe onsite for delivery of PC-295, TW-15.
1015	Barnebey Sutcliffe offsite.
1130 - 1230	Lunch
1240	Begin construction of piping from T-1 to PC-295. Clean out Substrate, Inocula, Equalization Tanks.

1530	Losl offsite
1630	Gah offsite
1715	Tletje offsite.

David Fields

10/9/01

9:15 Tietje, Goh onsite. Stopped at home Depot enroute to site to pick supplies.

Resume construction.

11:50 - 12:30 Lunch

Continue construction.

1600 - 1615 Offsite.

David Tietje

10/10/01

8:30 Tietje / Goh onsite.

12:00 - Goh breaks for lunch.
12:35 - 13:05 Tietje - lunch

1630 Goh offsite.
1715 Tietje offsite.

Davie Tietje

10/16

Completed Piping From T-1 to EQ-Tank 1 except nutrient & substrate feed piping. Begin working on piping from ~~EQ Tank #1 to~~ Anaerobic Bioreactor to EQ Tank #2.

10/11/01

800 D. Tetje onsite.

815 Begin working on piping installation for Substrate + Nutrient feed Tanks.

900 Mike Goh onsite.

~1030 M Losl on-site. Deliver Hydroxyl media for one of the PC-29 reactor trains.

~1045 Sullco electrician onsite. Conduct site walk to review scope of work.

1145 Sullco offsite — will begin work Monday - estimated 3 days labor to complete project.

~1115 - 1215 ? R. Zuromski onsite for site walk / project status review. Per Richard, it appears that we will be able to discharge to ~~the~~ sanitary sewer - he is awaiting on discharge reqts and nature of discharges allowed (e.g. batch).

1290 - 1315 Lunch break.

1500 Losl offsite

1700 M. Goh offsite

1720 D. Tetje offsite.

Today, completed piping associated w/ metering pumps. Began work on piping for dilution feed. Called Barnebey Sutcliffe to request a replacement PC-29 vessel - this will be done next week. Forgot to install tap for air injection into PC-29 - may use 1/2" drain port - should plumb prior to start-up.

10/12/01

10/1

8C

8 30 D. Tietje onsite.

900 M. Gol onsite.

81

Continue construction. Work on Secondary treatment piping (finish) and clean up electrical, etc. Also working on piping for dilution feed.

9L

IC

1235 D. Tietje offsite - to PU parts + lunch.

1330 Return to site.

1345 Resume working.

1630 D. Tietje offsite.

Today: Completed piping for secondary treatment components. Completed piping for MW-7 well feed to EQ Tank 1. Completed piping from Fresh water feed tank to LPGAC to EQ Tank 1.

10/15/01

0900 D. Tietje onsite. M. Gol already onsite.

Today: will work on a Inlet piping to freshwater feed Tank and hose connections to Baccula tanks. Will also PU 1-in hose @ Ryan Herco (for discharge).

0945 Solleco onsite. Told us it would take them need. to complete job w/ 2 persons (Jerry + Dave - support).

1000 Called Gunnar Bralek to discuss situation - that we understood 1 person would be present to do the work, that we were never notified of a second person, + need to know what we will be charged, etc.

1215 - 1315 LUNCH

1345 M. Goh offsite.

1900 S/W Losl - said we did not need to scrub inlet to Water Holding Tank.

1500 s/w Losl - told him we will be checking w/ Jacobs on loc'n of nearest sanitary sewer hookup. Losl / will communicate this to Zaromskis. We are not to install hookup until authorized by Zaromskis.

Begin filling 1 PC-29 w/ Hydroxyl media - will fill about 2/3 full - i.e. ~ 2 ft. # boxes - 1111

Filled 1 PC-29 w/ scrubbers impregnated w/ Celite - took 1 3/4 boxes

1330 Soheco offsite.

1630 D. Tietje offsite.

David Tietje

10/16/01

8:25 D. Tietje onsite M. Goh already onsite.

S/W Jacobs Eng. "electrician" - told me we should ask our JPL contact to send a Jacobs facilities person to site to show us the nearest sewer connection.

8:45 Perform site walk w/ M. Goh. Determined that today we need to focus on site housekeeping + safety - need to install platform over piping B loose by breakers + construct secondary containment (check w/ Lori)

- Checked w/ Lori on conveying to Richard that we should set up mtg. w/ JPL facilities to confirm sewer location
- Checked w/ Lori on Secondary [redacted] Containment

562-706-1798 – JOE – B-S (cont)

– Told me to go ahead and add media to bioreactors (but not aerobic bioreactor)

915 Left msg for Joe / Bamebey regrd tomorrow's delivery

930 Solleco onsite.

1015 Sim Joe / Bamebey – said PC-24 would most likely be delivered Fri., w/ Thur. PM as the best scenario – I told him to try to expedite for Thursday, but we can accomodate Fri. if necessary.

30-12N Mike Goh offsite to PU Vinyl tubing for discharge

LUNCH BREAK

1430 Solleco completes electrical installation sow. Begin testing electrical outlets + equipment:

TESTED:

- Freshwater Feed Pump – On until LSHH T1 trips it off
- Solenoid – tested manually
- P-1 – tested on/off (off until recirculating high level (LSH))
- All electric outlets – for metering pumps & centrifugal pumps – OK

Flow restrictor – ΔP too high – not enough P for inlet to PC-24 (~0)
→ removed flow restrictors, repaired piping.

Tomorrow –

Resume hydrotesting
Build platform over piping btwn. T-1 & bioreactors
Replace PR-1

1630 Offsite

Dive Trip

10/17/01

835 Tie-fe onsite. Goh already onsite.

845 Resume System Testing

- Test piping / process from T-1 through 1 train of PC-24s to EQ Tank 1 — OK
- Change-out recirculation pump P-R1
- Reverse direction of solenoid — installed w/ outlet on feed side; during testing solenoid did not close properly (completely).

1045 - 1230 offsite to PU hardware for PC-24, wood to construct platform over piping. & get lunch.

Re-test solenoid:

Closes when power is off (breaker in off position)

Closes when H-H float in freshwater Feed Tank trips

(at max water level ~ 575 gal)

1300 Install hardware in PC-24 → Re-start test - flow from EQ1 to EQ2, etc.

1335 S/W Mark Losh - said it is OK to run tap water through UX unit into Baker Tank.

15-
1605 Replaced high-high float switch in Freshwater Feed Tank - ball float installed by Solleco would not cause solenoid to open when high high cleared (water fell below level of ball)

1630 Offsite.

Daniel Tietz →

10/18/01

830	Tietje onsite. S/w Losi enroute — Navy COTR + RPM will be onsite today 10 - 10:30 for site walk.
	Clean up site, keep for site visit.
920	R. Zuromski stopped by site w/ OTTR (?) and Sheila Larson. Will return to site in ~ 30 min — so Losi can participate in site walk.
945 - 1100	Met w/ Zuromski, Alex, Sheree Discussed possibilities for effluent discharge. will not be able to discharge to storm drain.
12 - 1	Lunch —
1:15	Tietje offsite.

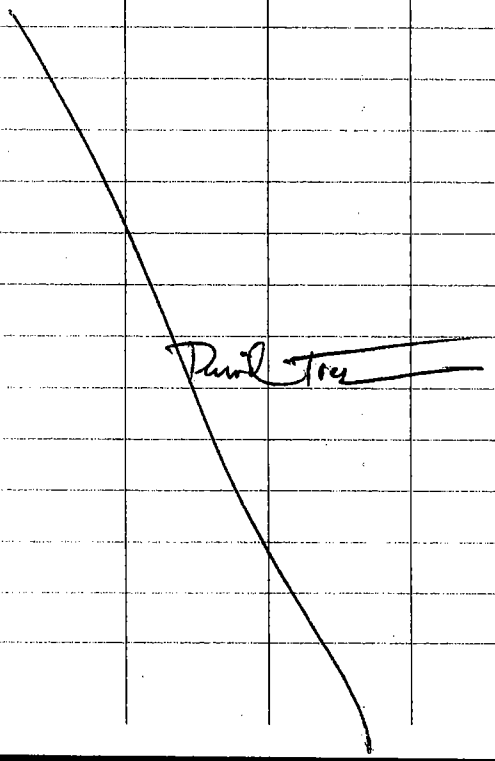
Randall Tietje

JUNE 12, 2002

1045 D Trefja on-site.

1100 – 1200 Worked on collecting samples from discharge of system – Baker Tank. Collected samples for analysis for VOCs, SVOCs, PCBs, Pesticides, Metals, pH.

1240 Depart site. will transport samples to laboratory in Irvine (Del Mar Analytical).



August 12, 2002

0900 D. Tietje onsite.

0915 Lft msg w/ Letticia Woodward of JPL re: meeting me here @ site.

Inspect recirculation portion of PBR system to make sure all components are OK, check for leaks, etc.

1000 Met w/ Letticia W. re: staging Baker Tanks. She explained the preferred area for staging, which will utilize the back corner of the lot (one space for people backing up) and 5 adjacent parking spaces. I told her I would measure off the area & confirm if this was acceptable.

1015 Confirm hardware needed for kids of PC 245.

1100 Depart site to pick tools, hardware req'd for start-up.

1230 Return to site

1300 Measured off area recommended by JPL for staging tanks. This area is OK - 3 tanks will be set up lengthwise, side-by-side, w/ about 3 ft on either side of each tank. Will take up 6 parking spaces.

1315 Begin working on adjusting amt. of media in bioreactors - should be about 2/3 full per Vitthal and securing hardware for testing.

1530 Stu Meuk Lost & confirmed start-up for Thursday. He requested that we fill the reactors & Anaerobic tanks w/ water, & that the water should be first

—run through the GAC.

1730 Clean up & Depart.

Derek Tiz

AUGUST 14, 2002

0730 Arrive on-site, D. Tietje. P. Tinnes & Island Environmental on-site.

Proceed to treatment system.

0745 - 0815 Island Env'l hauls 4000 gallons from Baker Tank on-site. Tank is now empty.

830 Standby - waiting for JPL contact to arrive to sign manifest. Left message about 815.

0910 Mark Arabi stops by to sign manifest. I took the copy marked "copy" and a copy of the work order for our records.

0920 Left msg for Letitia W. - JPL - indicating we were considering moving back tank delivery to EARLY MONDAY / TUESDAY.

1030 Rec'd call from Letitia / JPL re: delivery date/times for tanks / fencing. Said she would check w/ Security & get back to me.

1600 Spoke w/ Steve of Rain for Rent Tanks - he said we should assume the tanks will be delivered Mon. AM (2) & Tues. AM (1). He said he will call back tomorrow w/ deliver info.

1715 Finished adding approx. 200 gal 'trip' water, treated w/ GAC, into each bioreactor system.

1730 Clean up & depart site.

D. Tietje

NOTE: PUMPED OUT APPROX. 1100 GALLONS OF WATER OUT OF INFLUENT EQ TANK INTO BAKER TANK (ALONG W/ APPROX. 600 GAL [illegible] [illegible]

— FROM FINAL ER TANK (ASSUME THIS WAS TAP H_2O)

AUGUST 15, 2002

0700 D. Tietje arrives on-site.

0710 M. Losi – CEM calls – says he is leaving the lab for the site.

0730 P. Timnes on-site.

0930 M. Losi on-site.

1000 Calibrate pH meter to pH standard 7, calibrate to standard 10 – set slope – then recheck pH 7 pH meter is not calibrating well. Losi will be picking up new pH electrode

1025 Losi off-site.

1115 Added sodium acetate FTW media, mineral salts and sodium Cl [illegible] to each reactor system in amounts provided by CEM.

1215 Collect water samples from effluent of reactors 1 & 2 –

reactor 1: pH = 6.08 *
T = 25.9°C

reactor 2: pH = 6.11 *
T = 24.5°C

* Incorrect readings Mistakenly thought cond. meter was pH meter

1230 Add ~25 ~~100~~ mL caustic to each reactor system. (per phone conv. w/ Losi)

R1 – Added 31 mL

R2 – Added 51 mL

1300 checking pH in R1, R2 effl.

R2 – 7.00

R1 – 6.97

(Using new pH probe, and new calib. stds.)

R1:
T = 25.9°
pH = 7.01
cond = 3.42 dS/m

* Checking calibration for conductivity meter → Losi will check – units differ b/tn. soln. & meter

R2:
T = 25°C
pH = 7.01
cond – 3.3 dS/m

S/W Tom — N'41 Construction Rentals

& confirmed his crew will be on site

7:00 – 7:30 on Tuesday.

1315

Checking perchlorate concentrations:

Verified ClO_4^- – standards – 1 to 100 mg/L

w/ ClO_4^- ISE meter.

Check ClO_4^- conc. in R1 – 109.6 ppm

in R2 – 61.0 ppm

Rechecked $[ClO_4^-]$ in R2 -> 90.5 ppm

Diff. in starting conc. is probably due to greater vol of water in R2 system, since sponges are more porous than Hydrogel media.

1400 Inoculated both reactors

1415 Losi off-site. He advised me to check pH, T, and ClO_4^- concentrations for both reactors @ the end of the day.

1545 Collect samples from R1, R2 effluent

Check pH, T, conductivity

R1 – pH – 6.94

T – 29.2

cond – 3.77 dS/m

R2 – pH – 7.05

T – 27.6°

cond – 3.50 dS/m

Check $[ClO_4^-]$

R1 = ~~1690~~ mV → $[ClO_4^-]$ = 75.7 ppm

R2 = 165.5 mV → $[ClO_4^-]$ = 71.3 ppm

1605 Confirmed results w/ Mark Losi.

Send to check concentrations again tomorrow AM.

Astro Plumbing —

Gonzalo Alvarez — U.S. citizen

Jesus —

1630 Continued w/ security that they are on w/ Monday deliveries. Recommend we barricade off 6 spaces. OK to move PE tank around. (?)

1645 offsite.

D. Trejo

August 16, 2002

0730 D. Tietje, P. Tilmes on-site.

0745 Set up barricades for Monday's tank deliveries.

Collect samples from each reactor system

0950 Calibrate pH meter — calibration to 4, 7, 10 — OK.

Check pH, cond, T in samples

R1 Eff — T — 24.7°C, pH — 6.88, Cond. — 3.42

R2 eff — T — 24.8°C, pH — 6.98, Cond. — 1.71

[redacted] —

Calibrate ClO_4^-/pH meter

(1) Prepare 100 mL samples to take readings.
(2) Allow samples to equilibrate w/ standards
(3) Checked calibration — checked 75, 50, 10, 1 ppm standards — OK
(4) Checked R1 eff — 1.45 ppm
R2 eff — < 1 ppm

SW MARK LOST —

ADD ClO_4^- AND CONTINUE TO MONITOR DISAPPEARANCE

WILL BE ADDING 104.5 g $NaClO_4$ TO EACH REACTOR, AND [redacted] CHECK ClO_4^- CONCENTRATIONS IN AN HOUR OR SO.

940 Added 1095 g $NaClO_4$ to each system.

1005 Depart site to go to ICI. P. Tilmes will be on-site & will check readings in an hour or so!

1110 (1) prepare 100 mL samples to take readings
(2) Allow samples and standard to equilibrate

③ Checked calibration with 75, 50, 10, 1 ppm @ IC

④ checked R1 eff 47.4 ppm
R2 eff 33.6 ppm

1220 Added 109.5 g NaClO4

to each system

1530 Return to site

1620 Collect samples R1 eff, R2 eff

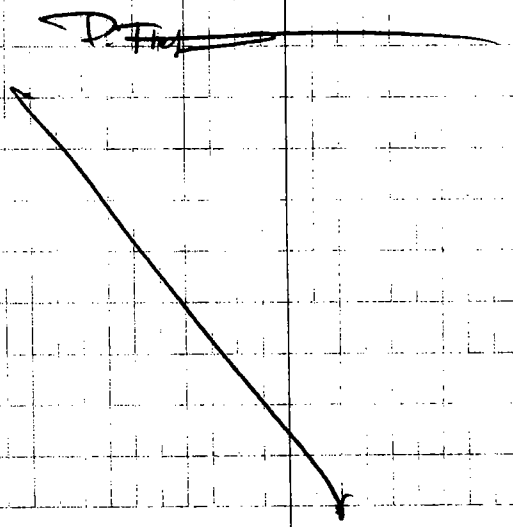
- Make up 100 ml samples of each reactor effluent w/ ISA solution.
- Allow samples to equilibrate w/ standards
- Check parameters:

R1 eff		R2 eff	
pH -	6.8	pH -	6.88
T -	30.7	T -	29.4
cond -	3.7	cond -	3.76

- Check calibration w/ 100, 10 ppm - OK
- Check R1 eff - < 1 ppm (reading 314 mV)
  R2 eff - < 1 ppm (reading 314 mV)

1645 Slw Mark last. He requested that I add 110 g more ClO4- to each system & also try to hook up aquarium pumps to introduce O2 into both systems.

1715 Clean up & depart site.



MONDAY Aug. 19 2002

0600 D. Tietje onsite.

Prep for arrival of Baker Tanks.

0630 Radn For Rent Tanks onsite. Delivered 2 21,000 gal tanks into allotted area. Tanks are 40' long and 2 additional parking spaces will be needed to accommodate these & a 3rd tank. Left message for Leffler — 3rd concurrent space required — 2 additional spaces.

0700 Radn For Rent personnel offsite.

0710 Check system — collect samples R1 eff, R2 eff

0715 Flow through R1 system is v. slow — hose to pump inlet is crimped — may need to replace

Check calibration of pH probe. Calibration ok.

Make up 100 mL "samples" of R1 eff, R2 eff w/ ISA soln. Allow samples to equilibrate w/ standards.

Check pH, T, cond:

R1 eff: 7.61, 23.2, 1.82

R2 eff: 7.80, 23.7, 3.29

check standards 4, 10, 50, 75 —

4, 10 standards ok

50 standard off — 156.6 vs. 179.2

75 standard ok —

Check R1 eff: 307.7 → < 1 ppm ClO_4^-

R2 eff: 283.7 → < 1 ppm ClO_4^-

0805 Shut off the operation
Slw Lost re results, Asked me to add 2x 100 mL to both reactors. Check $[ClO_4^-]$ in about 1 hour & then @ the end of the day... Also informed him that we are almost out of ClO_4^- solution.

P. Times on-site.

0910 P. Times off-site to PN pump to replace inlet hose for R1 recirculation pump & secondary treatment pump refitting.

0920 Left msg. w/ Price Pump Co. tech support.

0935 Collect samples R1 eff, R2 eff

Check parameters:

R1 eff: pH - 7.59, T - 23.2, cond. - 3.62
R2 eff: pH - 7.59, T - 21.9, cond - 4.78 (not fully immersed)

Verify ~~cal~~ calibration standards 1, 75, 100 ~~=~~ OK

Check R1 eff. : Reading is 168.7 mV
R2 eff. : " " 166.0 mV
corresponding to $[ClO_4^-]$ of 62.8 ppm & 69.9 ppm, respectively.

1005 Dr. Tietje off-site.

1945 Changed out centrifugal pump for R1 system. System was down (not recirculating) for about 2 hrs during pump troubleshooting.

1500 Slw Yardley Pump & Price Pump re: the pump cavitation problems we are having. They recommend 6-12" straight horizontal run into pump inlet, w/ no restrictions on the discharge.

1600 Slw Letricia of JPL She said she will try to confirm if we can get an escort for RFR Tanks tomorrow, wanted me to leave her the names of the guys for NVI Construction (and to let them know they will need proof of Amer. residency if not U.S. citizen), and that As the Plumbing delivery is approved.

1615 Collect samples from R1 eff, R2 eff.

Make up 100 mL samples w/ 2 mL ISA soln. Set samples aside to equilibrate w/ standards

Check Parameters:

R1 Eff: pH, T, cond.

/ | \

7.41 25.8 2.06

R2 Eff: pH, T, cond.

/ | \

7.59 25.6 1.94

Check Standards

100 – ok

50 – ok – 180.9

10 – ok – 220.4

Check R1 Eff. — 315 mV — <1 ppm

R2 eff. — 314 mV — <1 ppm

1645 SLW Meeting Log: Based on results, advised me to

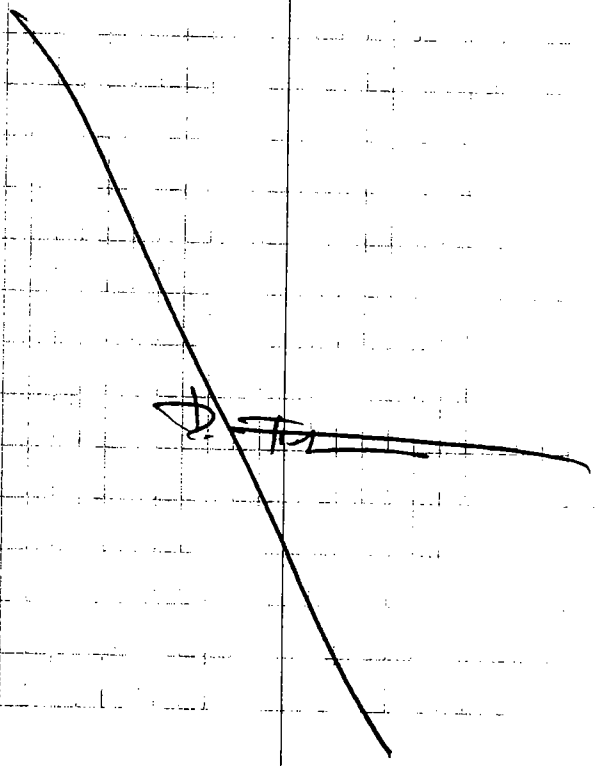
(1) Turn on aerator

(2) Add 1.3 kg NaAc to each reactor to make 0.5 g/L [NaAc] – add this to build up biomass; biomass will be washed out w/ forward flow. Should also check w/ VFA test.

1700 Turned on aquarium pumps, which feeds O_2 into both reactors.

Confirmed personnel info. for NTU Rental Fence w/ Letitia (left msg.)

1705 offsite.



TUESDAY AUGUST 20

0615 D. Thetje on-site. Recd call from Steve — Rain For Rent Tanks — en route to site explaining his driver had been delayed and was trying to make other arrangements for a prompt delivery (per my request, since he did not expect his driver onsite until 9 A).

On way home from site yesterday, Jesse from N'41 Rent-A-Fence called & said his guys were both permanent residents & would have their proof of residency cards.

S/w Vitthal — said (we should only add ½ of the ~~quantity~~ mixture needed to make .5 g/L today then the other ½ in a day or so.

0630 Collect samples to check parameters. System is running ok — Pressures ok, etc. Quite a lot of foaming is still — occurring ^in the inside tank for R2.

0645 Check parameters for R1 eff: pH – 7.43, cond – 3.72, T – 23.8 °C
Check parameters for R2 eff.: pH – 7.53, cond – 3.52, T – 23.7 °C

0700 S/w Lost — he concurred w/ Vitthal's suggestion to add ½ of the amount needed to make .5 g/L today, then ½ later. He also said I may be able to control foaming by turning down air.

0715 Steve from Rain For Rent called. [805-525-3306] He said his delivery person would not be able to get to the site until ~830. I told him that we would need to reschedule — Wed. @ 6:30 A — RAMON.

0720 Added 650 g $NaAc \cdot 3H_2O$ to R1 inoculum tank.

0740 Added 650 g $NaAc \cdot 3H_2O$ to R2 inoculum tank.
Also turned chem air into both tanks.

0815 National Rent-A-Fence on-site.

0915 National Rent-A-Fence off-site.

1000 Astro Plumbing drops off galvanized pipe.

1015 Sun Valley Asphalt delivers 1 yard cold patch asphalt.

1040 P. Tinnes off-site.

1100 Joe - Barnaby Sutcliffe will be coming by site on Thurs. to bring gaskets & launch them (they will have tool).

1300 Begin working on installing galv. pipe across parking lot area.

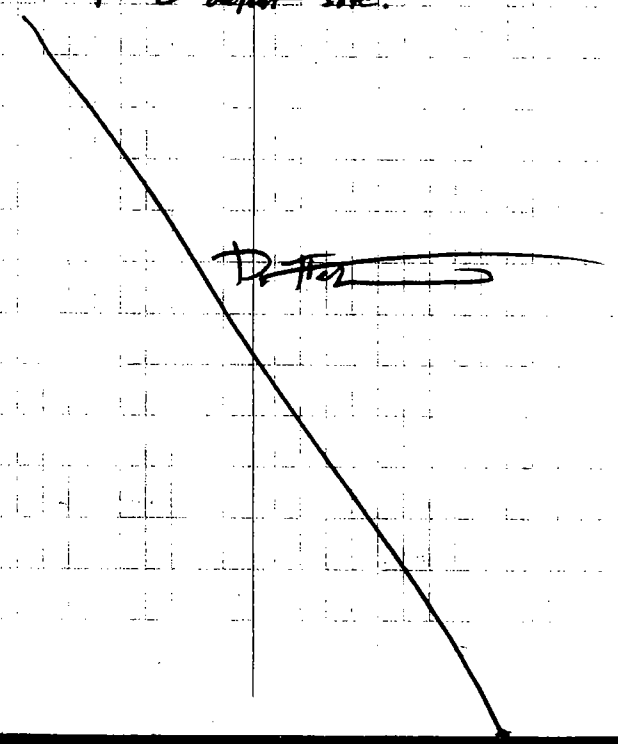
1500 Finish working on pipe / speed bump installation.

1530 Collect samples to check parameters.

R1 eff - pH - 7.54, T - 25.5°C, cond. - 4.21

R2 eff - pH - 7.67, T - 25.2°C, cond. - 9.09

1595 Clean up & depart site.



WEDNESDAY AUGUST 21

0695 D. Trefz on-site.

Rain for Rent Tanks on-site.
Dropped third 21,000 gal tank
c. 0600.

0650 RFR offsite.

0700 System check — OK.
Collect samples to check parameters.

First calibrate pH probe —

R1 Eff :
pH - 7.67
T - 21.7 °C
Cond. - 3.96

R2 eff :
pH - 7.82
T - 22.0°C
Cond. - 3.82

0730 S/W Mark Lost, Com. told me I should add acid if pH ≥ 8.0, do not add acid overtake until tomorrow, and that he would let me know the status of the call.

0830 Called P. Timms. Asked him to PM a pick and device to pull tubing through pipe.

0845 Depart site to PM supplies

0925 Return to site.

1045 S/W lost. He wants to shut off the recirculation for hour long periods several times per day while I am here, and also to consider cleaning up the reactors & looking at the media for evidence of biofilm.

1250 Shut off recirculation pumps for both systems.

Joe Leslie called during lunch. He will be onsite c. 11A tomorrow w/ Ricky Vargas.

1300 Called in request for site access for Joel Ricky Letricia USPL.

1420 Resumed recirculation in both reactor systems (re-started both pumps)

1630 Collect samples R1 eff, R2 eff.

R1 parameters:

pH – 7.76 – OK < 8

T – 26.5°C – OK < 35°C

cond – 439

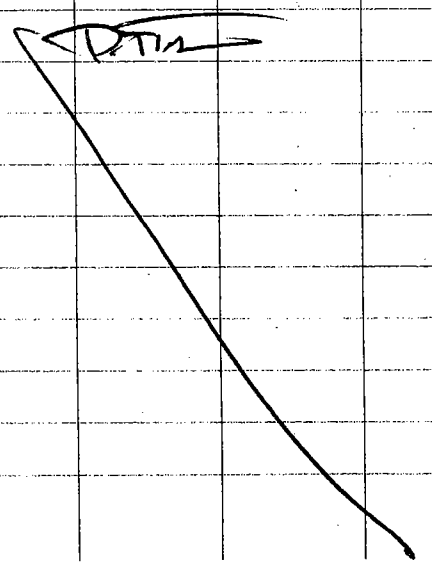
R2 parameters:

pH – 7.09 OK

T – 25.3°C OK

cond – 9.11

1645 Clean up & depart site



Thursday August 22

0830 D. [illegible] onsite.
P. Times onsite.

0845 Adding 650 g NaAc to each reactor system.

Collect samples R1 eff, R2 eff.

Calibrate pH electrode

0900 Check parameters:

R1 Eff
pH - 7.76 - OK
T - 21.2 - OK
Cond ~~[illegible]~~ - 3.9

R2 Eff
pH - 7.89 - OK
T - 21.2 - OK
Cond ~~[illegible]~~ - 3.7

0915 Work on setting up, calculating feed rates for substrate, nutrient feed.

1100 BSC onsite to replace leaking gasket on PC-24. Will also make up additional spare gaskets.

1145 BSC offsite.

1200 Stop system circulation.

1330 Resume system circulation.

1430 Tested secondary portion of treatment for leaks & pump operation - OK.

Begin filling substrate & nutrient feed tanks w/ water passed through CAC/IX.

1545 Per M. Last, start w/ 600 mg/L NaAc in total flow ~~[illegible]~~ $(NH_4)_2PO_4$ to make 0.5 mg/L NH_4-N and enough 2 to 10 mg/L HPO_4-P

1600 Add 128 g NaCl to each reactor

1635 Shut off O_2 to reactors (per Mark Last, this will need to be left off now — overnight).

1645 P. Thomas off-site.

1710 Collect samples R1 eff, R2 eff

Make up 100 mL "samples" w/ ISA for testing. Allow samples to equilibrate w/ standards

Check parameters:

R1 EFF

pH — 7.63 — OK

T — 27.5 °C — OK

Cond ~~Temp~~ — 2.70

R2 EFF

pH — 7.81 — OK

T — 26.4°C — OK

Cond ~~Temp~~ — 4.64

Calibrate ClO_4^- probe:

Check standards

1 ppm — OK ~~270.8~~ 265.0

10 ppm — OK 193.5

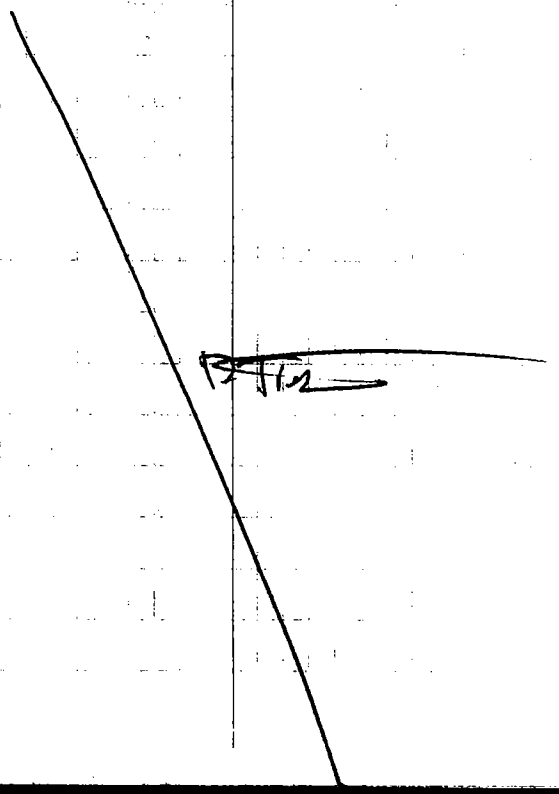
25 ppm — ~~[redacted]~~ — OFF

50.75 ppm —

Checked R1 eff — result is 162.5 mV STEADY ~75 ppm

R2 eff — result is 213.3 or ~40 ppm

1800 Depart site.



FRIDAY August 23

0720 D. Tietje, P. Thames on-site.

TODAY: CONTINUE FILLING SUBSTRATE FROM TANKS w/ CAC— WASH TO WATER & MONITOR ClO_4 — DISAPPEARANCE

0795 Collect samples R1 eff, R2 eff —

Make up 100 mL solutions for samples.

Allow samples to equilibrate w/ standards.

0755 Check parameters

R1 EFF:
pH — 7.53 OK
T — 21.9°C OK
Cond [redacted] — 2.37

R2 EFF:
pH — 7.64 OK
T — 21.6°C OK
[redacted] cond — 4.20

0845 Calibrate ClO_4 — probe —

Check standards

1 ppm — 2080 — OK (vs 2122)

10 ppm — 211.8 — OK (vs 214)

25 ppm — 185.9 — OK (vs 191.3)

50 ppm — [redacted] 165.6 (vs 174.2)

75 ppm — 161.4 OK (vs 162.6)

Check samples —

R1 EFF — > 300 ⇒ < 1 ppm ClO_4 —

R2 EFF > 300 ⇒ < 1 ppm ClO_4

915 Reported results to Monte Lorsl. He said we do not need to add more ClO_4 — just turn on the air for the weekend, then shut it off ~~over the~~ w Monday AM.

Shut off circulation in both reactors.

1040 Turn on recirculation pumps.

1295 D. Tietje offsite.

MONDAY AUGUST 26

0715 D. Tietje, P. Timmes onsite

Add NaAc to substrate feed tanks to make [NaAc] of 6000 mg/L.

- 3.4 kg per 150 gal tank
- 10.8 kg per 475 gal (tank)
(Added 3 × 3 kg + 1 × 2 kg)

Will Need More NaAc by Friday to refill tanks

Add $(NH_4)_2HPO_4$ to Nutrient feed tanks (300 gal) to make $[(NH_4)_2PO_4]$
- 450 mg/L for tank
≈ 500 g.

0805 Figure Settings for Metering Pumps

NaAc Feed — 6 gal/hr

8 gal/h × [illegible] × .85 ≅ 6.1 gal/h
↑ ↑
speed stroke

$(NH_4)_2PO_4$ Feed — 3 gal/h

8 gal/h × .65 × .6 ≅ 3.1 gal/h
↑ ↑
speed stroke

Set up equipment — prepare for forward flow testing.

0930 Begin forward flow testing.

Q_{well} = 5.23 gpm

Q_{R1} = 3.3 gpm
Q_{R2} = 2.0 gpm
} will try to balance

0945 Zero totalizer for 3 flowmeters (well, reactor 1 influent, reactor 2 influent)

1130 Silva Lab — told me it was important to get samples on ice immediately. Also, we should check up the lab on hourly basis to ensure rxn ($CH_4 \rightarrow$ reduction) by changing

the pH so as not to upset the analytical ~~method~~ analysis.

1240 Balanced flow into R1 by throttling back flow — now $Q_{R1} \approx Q_{R2} = 2.5 - 2.6$ g/pm.

1245 Collected sample from R1 INT.

Measure 100 mL of sample

Measure pH - 7.67

Added 2 drops 10 M NaOH to sample — pH changed to 11.42 — OK

1345 Cannot calibrate Hach 40 for pH, D.O. Patrick will take back to office today to get assistance & return to lab if necessary.

1430 Slow Losi — Learned that I added about 3x more acetate than needed to make 600 mg/L — but this is OK since boys were used to 1000 mg/L, then 500 mg/L. He said I should dilute this conc. by 1/2 when the tank pumps down half way (tomorrow PM or Wed. AM). Then for the next batch that is made up Friday I can make it up @ 600 mg/L.

1445 Left message for Dennis Reyes-mm, letting him know we are ① going to added 1 drop 10 M NaOH to 1 (effluent) sample for the 3 analytes, and would also collect comparison samples w/o adding the NaOH (per LOSI), and ② we would need a 1 mg/L R2 for Acetate.

1500 Stopped flow to reactor 1 to repair leak on in-line mixer connection.

1600 Resume forward flow through R1

1640-1700 Stopped forward flow through R1 again to repair another leak.

1800 Put R1 system in recirculation mode - due to leak in influent line to R1 - cannot repair today, do not have fittings. Put treated water into start-up tank, added 250 g NaOCl to make 330 mg/L in solution. Then re-started recirculation. Continued forward flow through R2.

1815 Departed site.

D. Fry

TUESDAY AUGUST 27

0745 D. TUTTLE, P. THOMAS ONSITE. STOPPED @ HOME DEPOT FOR ROUTE TO SITE TO PICK UP PARTS TO REPAIR PIPING FOR R1.

0750 SLW LOST RE SAMPLING FOR TODAY DUE TO R1 FLOW BEING SHUT DOWN. HE SAID WE SHOULD PLAN TO SAMPLE TOMORROW (BOTH LINES @ SAME TIME). KEPT MSC. FOR CHEMS OF MUCH LOADS CONFIRMING THAT WE WILL BE POSTPONING SAMPLING TO TOMORROW.

0800 DISCOVERED THAT INFLUENT FEED PUMP WAS OFFLINE. TRACED PROBLEM TO CLOGGED BAG FILTER — LOW DISCHARGE & CAUSED AIR TANK & TO BACK UP WHICH IN TURN SHUT OFF THE FEED PUMP FROM AIR TANK 1, WHICH BACKED UP & SHUT DOWN THE INFLUENT FEED.

0810 @ 2.5 gpm. FLOW RESUMES THROUGH R2 & TREATED 2750 GAL THROUGH R2 SINCE START-UP YESTERDAY. BASED ON THIS FIGURE THE FLOW THROUGH R2 WAS DOWN FOR ABOUT 4-4.5 HRS LAST NIGHT.

ALSO — FOR NUTRIENT FEED, SHUT OFF FLOW INTO R1 LINE BUT DID NOT ADJUST PUMP OVERALL FLOW (DID NOT CHANGE PUMP SETTINGS), ALSO SOME SOLUTION LEAKED FROM FEED TANK. FEED FROM SUBSTRATE TANK #2 LOOKS OK.

0830 Collected samples from R1 EFF & ~~from~~ (UV RECIRC MODE) & Checked PH — 7.29 OK

0900 Repaired section of tubing for R1 INF.

0945 Resumed normal flow feed through R1. Flow is ~2.5 gpm through both systems.